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It is known that comets do not follow closely this law of brightness, but the deviations in this case seem larger than usual.

The comet's perihelion distance being 1.35, and the Earth being near that longitude at the same time, will cause this apparition to be one of the most favorable possible — the Earth and comet approaching each other to a distance of only thirty million miles.

The disturbing action of *Jupiter* is well illustrated in this case. M. SCHULHOF states that although the comet did not approach *Jupiter* nearer than 1.9 units, the time of perihelion was retarded more than fifteen days. C. D. PERRINE.

MT. HAMILTON, 1899, May 9.

THE ORBIT OF COMET 1896 III.

Comet 1896 III was discovered by Dr. LEWIS SWIFT, at the Lowe Observatory, on April 13, 1896, [see *Publications A. S. P.*, No. 50, page 93]. During its apparition period, which extended to June 20, 1896, the comet passed through a heliocentric arc of 105°,— 4° before perihelion passage, and 101° after,— and was observed more than four hundred times at thirty-seven different observations.

Having collected all the observations, I combined them into seven normal places, and from the resulting fourteen equations of condition deduced, by the method of least squares, the following most probable set of

HYPERBOLIC ELEMENTS.

$$
\begin{array}{rl}
T = & 1896,\ \text{April } 17.6473143,\ \text{G. M. T.} \pm 0^{d}.0005733 \\
\left.\begin{array}{r} \pi = \\ \Omega = \\ i = \end{array}
\begin{array}{l} 179^{\circ}\ 59'\ 15''.40 \pm 3''.95 \\ 178\ \ 14\ \ 51\ .48 \pm 6\ .74 \\ 55\ \ 34\ \ 24\ .69 \pm 8\ .88 \end{array}\right\} & \begin{array}{l}\text{Mean Equinox and} \\ \text{Equator of 1896.0}\end{array} \\
q = & 0.5662857 \pm 0.00001347 \\
e = & 1.0004757 \pm 0.00009985
\end{array}
$$

The details of the computation will be found in *Astronomische Nachrichten*, 3550–51.

The interesting element in this orbit is the eccentricity, which shows that the comet's path around the Sun was an hyperbola.

In the few cases where a definitive investigation of a comet's orbit has indicated an hyperbolic curve, doubt has usually been thrown upon the result. In the case of the earlier comets, the observations were too few, or not sufficiently accurate, to afford a reliable conclusion. In most of the later cases, it has been shown that a parabola, or even a very elongated ellipse, would represent the observations nearly as well as the hyperbola. But there are a few cases of very definite hyperbolic orbits. THRAEN, for instance, found for the Comet 1886 II, the value $e = 1.0002286$, and showed that the hyperbola gave residuals from the observed places only 1/122 part as large as those given by the best parabola.

Again, STROMGREN found the value of the eccentricity for Comet 1890 II to be 1.0004103, with a probable error of ± 0.0000130, or less than one thirtieth of the excess of e over unity. As both of these orbits were based upon ample observational material, it is evident that both comets were moving in hyperbolic arcs,—at least, during their apparition periods.

In the case of Comet 1896 III, I made a careful investigation of the effects of assumed variations of the eccentricity. Determining the variations of the other elements as functions of the variation of the eccentricity, and then assuming for the latter element the successive values 1.00000 (giving the most probable parabola), 1.00024, 1.0004757 (the definitive value), 1.00064, and 1.00080, I found for the sum of the squares of the residuals in the observation equations the values 1677.7, 965.0, 732.2, 843.1, and 1171.1, respectively. These residuals clearly showed that no improvement in the orbit could be made by changing the eccentricity, the best possible parabola making the sum of the squares of the residuals more than twice as large as the adopted hyperbola.

I conclude, therefore, that this comet also must be considered to have followed an hyperbolic path during its apparition period, though the figures are not so decisive as in the cases of the two other comets mentioned. R. G. AITKEN.

May 10, 1899.

GIFT TO COLUMBIA UNIVERSITY OBSERVATORY.

Science announces (April 14, 1899) that Miss CATHERINE WOLFE BRUCE has just given $10,000 to Columbia University, through Professor J. K. REES, to be expended for the measurement and discussion of astronomical photographs. Miss BRUCE'S gifts to the department of astronomy of Columbia now amount to $22,100.

Three New Double Stars.

In the course of my double-star observations in the past few months I have found the following new pairs :—

Cambridge (Eng.) A. G. 3993.
$7^h\ 24^m\ 5^s$ + 28° 6′.

			Mags.	
1898.890	254°.6	2″.07	8.5 — 12.5	36-inch.
.922	255 .9	2 .21	9.0 — 13.0	"
1898.91	255°.2	2″.14	8.8 — 12.8	

This pair is 29^s following and 1′ south of 65 *Geminorum* (β1174).

DM + 31° 1982.
$9^h\ 20^m\ 19^s$ + 31° 35′.

			Mags.	
1899.286	43°.6	0″.94	8.7 — 9.5	12-inch.
.303	47 .7	0 .77	8.7 — 10.0	"
.380	43 .6	0 .91	8.8 — 11.0	36-inch.
1899.32	45°.0	0″.87	8.7 — 10.2	

This pair was found while looking for Ho.366, which is 25^s following and 24′ north of it.

LL. 21535.
$11^h\ 11^m\ 44^s$ — 4° 36′

			Mags.	
1899.303	343°.5	0″.67	8.8 — 9.0	12-inch.
.358	338 .8	0 .66	8.5 — 9.0	"
.360	335 .9	0 .68	8.5 — 9.0	36-inch.
1899.34	339°.4	0″.67	8.6 — 9.0	

The 36-inch telescope also shows a fourteenth-magnitude companion 37″.5 distant from the close pair in the position angle 7°.5.

The star places are given for 1900.0. R. G. Aitken.

May, 1899.

Measures of *Sirius*.

Two measures of the companion to *Sirius* made this season with the 36-inch telescope give the following positions :—

1899.177	154°.3	4″.55	weight	4
.254	155°.6	4″.34	"	4

The distance is slowly increasing, though not so rapidly as the published orbits indicate, and the star is much easier to measure than it was a year ago. R. G. Aitken.